AGRARIAN REFORM, THE CATTLE INDUSTRY, AND RURAL FINANCING MARKETS

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I. INTRODUCTION

At first glance, the cattle industry seems to occupy a natural niche in Philippine agriculture in general and the livestock industry in particular. Roughly 90 percent of the cattle population is raised under backyard-farm conditions where, on the average, two heads of cattle are raised and fed with residues from crop farming activities (Bureau of Agricultural Statistics (BAS) 1990). Backyard cattle raising appears as a natural "sideline activity" where free labor hours could be put to productive use. In cases where the children do the rearing, a productive economic activity is realized with minimal opportunity cost. Cattle could also be made to perform some light draft before finally being sold.

The apparent natural integration of cattle raising into the smallholder farms, however, has not led to such expected consequences as expansion of the cattle inventory and the production of beef. Amid the rapid expansion of economic activity in the swine and poultry business which propelled the livestock industry to its stature as the fastest-developing and most consistent growth subsector in agriculture through the second half of the 1980s, the cattle population exhibited, in contrast, a continuous decline at the rate of about 2.5 percent annually during the same period.

It has been observed that significant reductions in the cattle inventory had been taking place in the commercial sector of the industry with a depletion rate of close to 20 percent every year. In the backyard sector, the decline in population during the same period was much slower.

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These trends reveal that the commercial and backyard systems are not independent of each other. In most cases, the breeding and reproduction of cattle take place in the commercial farms (Yazman 1991). Fattening and a host of other cattle-raising activities are subsequently performed at the backyard level.

That the economic activities at the backyard level have remained stagnant should be, by themselves, disturbing. In the event that the depletion of reproductive stocks in the commercial farms is not immediately arrested, the prospect of a faster decline in the activity at the backyard level in the future is not improbable.

The fast depletion of the cattle stock in the commercial farms has been attributed mainly to the uncertainties imposed on commercial ranching activities by the Comprehensive Agrarian Reform Law (CARL or R.A. 6657). Such uncertainties are also said to be compounded by the deteriorating peace and order situation in the countryside. But the extent to which these claims *in fact* contributed to the rapid reduction in the cattle population has yet to be established.

The uncertainty over the the fate of privately-owned commercial cattle ranches, however, has been diffused. On March 7, 1991, the Supreme Court ruled the exclusion from CARL coverage private lands used in the raising of livestock and poultry.

Apart from the private commercial ranches, a great deal of cattle ranching activity is also undertaken, but under government lands classified as pasture leases. As of 1986, 1,923 cattle farms have been operating under commercial status (BAS 1990). In the same year, 1,085 farms had been found to be bound by pasture lease agreements and pasture lease permits (Yazman 1991). As of May 1991, there were a total of 973 grazing leases covering an area of 377,355 hectares of public lands, with the average lease size averaging 390 hectares (Department of Environment and Natural Resources (DENR) 1991). Leases are obtainable at a very low rate of one peso per hectare. These pasture leases, however, have a history of extremely depleted stocking rates and slow rates of investments in pasture improvement, contrary to the stipulations in the pasture lease agreements.

It is perceived that breaking up the extensive lands into smaller-size and higher-priced leases will reverse the chronic historical underproductivity of pasture leases. The new arrangements may not preclude innovations like integrated agro-forestry-pasture-livestock systems.

The emergence of new and more intensive arrangements would have significant implications on the demand for financial intermediation.

II. REVIEW OF LITERATURE

A. *Supply Behavior of Cattle*

The supply behavior of cattle follows the general models of supply behavior of livestock characterized by lagged relations with its determinants (Arzac and Wilkinson 1979). The specification of the lag structure is quite complicated. First, livestock production is associated with a well-defined biological structure that limits the capacity of producers to readily respond to price changes in the short run. Second, the role of expectations has to be incorporated.

Where the lags are inherent, the whole process may be decomposed into a sequence of stages which can be analyzed individually. These stages, however, are functionally related by the overall technology of the production process. The decisions made at any particular level effectively restrict the range of potential adjustments that can occur in the subsequent periods. The biological lags inherent in the production process are a rich source of information for specifying the lag structure (Holt and Johnson 1982).

Livestock supply partial adjustment models for swine and poultry output in the Philippines had been done by Ingco (1985) and Erguiza (1985). A more recent study on the inventory and supply behavior of swine and poultry had been conducted by Costales (1990). Separate estimates were obtained for backyard and commercial activities.

To date, there seems to have been only one attempt -- by Mendoza (1990) -- to estimate the supply behavior cattle output in the Philippines. The results, however, were inconclusive. The difficulty in using standard lagged adjustment models to the cattle industry in the Philippines may stem from the more complicated decision patterns involved in the holding of cattle at the backyard level.

Jarvis (1982) developed a well-known and widely-used model for holding cattle in smallholder farms within the framework of multiple livestock use (e.g., draft, milk, meat, and calf production). The model employs a discounted benefit-cost analysis of the decisions to hold a male or a female animal. The model also yields the optimal age at which the animal is to be sold to the market for meat.

Costales (1990) employed the Jarvis model on the holding of carabao at the backyard level for purposes of draft and meat. The significance of the value of the animal as draft over its value as meat was a prominent result. The role of the interest rate was also significant as the costs are front-loaded and the benefits come further into the future.

A complete Jarvis model was not done for cattle in the absence of reliable data on the biological growth patterns of the average cattle, as well as on the extent of its use as draft. A simple backyard cattle fattening benefit-cost analysis, however, was done over a standard six-month period. The results showed that crucial in the decision to undertake a cattle-fattening activity were the price of feeder calf, the interest rate, and the technology available to influence average daily gain in weight. While the optimal fattening period could be determined by the model, intervening household decisions to engage in the activity which may either expedite or prolong the fattening period, were left unmade.

Where the benefits are derived only from salable beef and value of draft work, and costs are only in terms of the value of feeds, then the profit stream over time, expressed in its capitalized value, could be given as:

$$(1) \qquad \pi(t) = p.w\, e^{-rt} + v \int g(x,t)\, e^{-rt}\, dt - qx \int e^{-rt}\, dt$$

where: π (t) - capitalized value of the small calf

w - expected weight at slaughter

g - amount of draft services per unit of time

x - amount of feed consumed per unit of time

p - expected price of beef at slaughter

v - expected unit price of draft services

q - expected unit price of feeds

r - interest rate

t - 0,1,2, ..., T

The standard equimarginal condition for solving the optimal holding time would yield:

(2) $\dot{w}/w + vg/pw = r + qx/pw$ where $\dot{w}$ is the rate of gain in weight of the animal.

Obviously, $p\dot{w}$ would be relatively significant at the early stage when the animal is growing rapidly and is not yet available for draft. The rate of increase in weight, however, falls with age.

The inclusion of a benefit stream from draft would be expected to prolong the optimal holding life of the cattle, relative to a without-draft-value case. But the rate of increase in the value of draft should, after some point, likewise decline as the animal moves toward its prime. The rate of increase in the combined benefit stream would thus fall over time. The animal is then disposed of when the marginal opportunity and feeding costs of holding it have caught up with the marginal benefits (Jarvis 1982).

At this point, it could be said that the observation of holding relatively old steers before they are finally sold or slaughtered may indicate the realization of additional benefits to holding the cattle over its value as salable beef. Higher prices of beef would tend to increase the relative significance of the interest cost as the opportunity cost in delaying the sale of a higher-priced animal would become dominant.

The model, however, does not say anything about the overall profitability of holding a head of cattle or two. What can be said is that, *ceteris paribus*, higher interest rates and higher cost of feeds would reduce the overall profitability of holding cattle for both draft and meat purposes.

The role of feed costs is also interesting in that qx could be interpreted in various ways. To wit:

(i) If crop residues are abundant and readily obtainable, then the profitability of holding livestock is boosted. This would rationalize holding the animal for a longer period, *ceteris paribus.*

(ii) If qx represents opportunity cost of time and it happens that such is high, this may partly explain why not every household holds cattle. If crop residues and grasses are

scarce relative to consumption requirements, a high qx may mean that extra effort has to be exerted in scouring for crop residues and grasses.

(iii) A high qx may also literally mean high costs of commercial feed concentrates. If crop residues are scarce and commercial feeds have to be resorted to, the strongest way to offset high feed costs would be to have a high price for beef. Thus, high costs of non-farm feeds would, *ceteris paribus*, diminish the profitability of raising cattle in the backyards.

Tokrisna and Panayotou (1985) employed a similar optimum holding age model for a multi-purpose animal and applied it to explain buffalo- and cattle-holding patterns in rural Thailand. In essence, the model incorporates the general criteria embodied in the Jarvis model, where the animal is kept until the marginal benefits from holding the animal (increase in value as beef, as draft, or as breeding animal) are equal to the marginal holding costs of the opportunity of not selling the animal, probability of losing the animal through theft or disease, and maintenance charges (feeding) for another period.

The dominance of benefits from draft over the rewards from cattle as meat largely explains the relatively long optimal holding age for cattle in Thailand -- between nine and 10 years -- before the animal is led to the slaughterhouse. Tokrisna and Panayotou also constructed a model which estimated the behavior of cattle inventory in Thailand from 1960 to 1979. The significant variables explaining the behavior of the total cattle stock were the area planted to crops, interest rate, and dummy variable for the introduction of new imported breeds of cattle. The interest rate coefficient carried an unexpected positive sign. It was rationalized that during high interest rate regimes, farm households tended to increase the number of cattle to have an alternative source of cash in the future instead of borrowing from the bank.

In the Philippines, it must be emphasized that the capacity of backyard raisers to respond to price incentives is hampered by the capacity of the commercial ranches -- as privately-owned entities or as leases -- to supply the primary input to backyard cattle production: the feeder calf. It is thus imperative that the production processes and dynamics taking place in the commercial ranches be studied from the viewpoint of an agricultural enterprise.

B. *Review of the History of Government Support Programs for the Cattle Industry*

A review of the government programs for the livestock sector in the Philippines would reveal that the cattle industry traditionally received a significant budgetary allocation. Aside from programs aimed at developing well-adopted stocks through on-farm scientific researches, the other dominant forms of government assistance to the cattle industry were increased credit availability, coupled with extension of supervision in the proper raising of cattle.

The list of the major headings of government programs for the cattle industry in the Philippines from 1975 to 1990 appears in Table 1. In general, the credit programs involved concessionary interest rates on loans granted.

The identification of the programs under their respective headings, together with some of their salient features, are presented in the subsequent sections. Where information is available, project cost and activities are given.

Table 1

Summary of Government Programs for the Cattle Industry, 1975-1990

PROGRAMS	YEARS INCLUSIVE
Development Bank of the Philippines-Assisted Livestock Projects	1975-1977
Rural Banks-Assisted Livestock Production Projects	1975-1977
Philippine Bank of the Philippines-Assisted Livestock Projects	1975
Land Bank of the Philippines-Assisted Livestock Projects	1975-1990
Bakahang Barangay-Supervised Credit Program	1978-1987
Community Development Assistance Program (Livestock Components)	1982
National Livestock Production Program	1987
Government Program for Animal Industry Development	1990
Comprehensive Agricultural Loan Fund	1990
Multi-livestock Dispersal Program	1988

Source: Department of Agriculture, various unpublished documents, 1976 to 1991

A. Development Bank of the Philippines (DBP)-Assisted Livestock Projects, 1975-1990

1. Second DBP-IBRD Livestock Financing Program, 1975

Objective : To increase the production of livestock and poultry

Project Cost : $40.3 million

Beneficiaries : 72% of funds as production loans to:

a) Hog farms (priority)
b) Cattle farms
   - 60 hill-beef farms
   - 540 integrated coconut/cattle farms
   - 20 small cattle farms
c) Others

2. DBP-IBRD Livestock and Poultry Development Project, 1976

Project Cost : $20.5 million (IBRD), and P148.5 million (RP)

Beneficiaries:

a) Cattle raisers
   - Holders of Pasture Lease Agreements (PLAs)
   - Owners of private grazing land
b) Others

Loan: Maximum of P300,000 per borrower, non-collateral in nature

3. DBP Loan Program for PLA Holders, 1978

Project Cost : P55 million

Beneficiaries : PLA holders

Requirements:

a) Visible investment in fences;
b) One head per hectare stocking rate.

Term : 13 years to pay, five years grace period

Loan : Maximum of P300,000 per borrower, non-collateral in nature.

4. DBP Coco-Beef Financing Program, 1978

Beneficiaries: Holders of three hectares of improved pasture in coconut farms.

5. DBP Financing for the Cattle Fattening Industry, 1979

Objective : To increase the production and improve the breeding base of cattle stock.

Projects Eligible:

a) Straight backyard fattening (1-3 heads);
b) Special backyard fattening (four heads);

c) Feedlot fattening (10 or more heads);
d) Backyard "Pa-iwi" system loan;
e) Breeding-Fattening (one heifer; three steers);
f) Coco-Beef fattening (holders of coconut land less than 30 hectares).

6. DBP Breeding and Feedlot Financing Program, 1990

Project Cost : P70.36 million

Beneficiaries:
a) 250-head cattle breeding module holders;
b) 100-head feedlot module holders.

Novel Feature: Shift to medium- and long-term financing.

7. DBP-Department of Agriculture Cattle Dispersal Program, 1990

Revolving Fund: P200 million

New Features:
a) Cows are not given for free;
b) Direct lending to farmers'cooperatives;
c) Possibility to acquire more than three heads of cattle as backyard activity.

B. Rural Banks (RBs)-Assisted Livestock Production Projects

1. The Fourth Rural Credit Project, 1975

Objective : To develop small-scale livestock farm

Source of Funds : Third Central Bank-IBRD Credit Project

Project Cost : P53.9 million

Allocation : Swine and poultry activities (75%); cattle-raising activities (25%)

2. Supervised Credit for Animal Raisers, 1977

Objectives:
a) To increase the cattle and carabao population;
b) To provide short-term (one year) credit to backyard animal raisers.

Beneficiaries:
a) Backyard cattle raisers;
b) Backyard cattle and carabao breeders and fatteners.

Maximum number of animals: 8-10 heads

Supervision: Bureau of Animal Industry (BAI) Veterinarian

3. RB Livestock Financing Program, 1977

Objectives:
a) To provide small farmers with supplementary income;

b) To stimulate the growth of the livestock industry.

C. Philippine National Bank (PNB)-Assisted Projects

1. PNB Cattle Fattening Program, 1975

Objective : To boost food production by providing funds to qualified clients for the purchase of young cattle for fattening.

Project Cost : No definite allocation.

Beneficiaries : Farm owners who have organized themselves into "seldas" with sugar planters-PNB clients.

Loan Ceiling : P1,000 per borrower.

2. PNB Credit Program for Agrarian Reform Beneficiaries

Objective : To assist agrarian reform beneficiaries.

Loan Value : P3,000 to P5,000 per borrower.

Collateral : Farm lot, residential lot, and farm buildings.

D. Land Bank of the Philippines (LBP)-Assisted Projects

1. LBP Agrarian Reform Estates Development Program: Livestock Component, 1975

Objective : To finance credit requirements of agrarian reform beneficiaries.

Project Cost : P403.8 million (over a four-year period)

Allocation : 56.3% of the funds is meant for livestock and poultry projects, of which 24% is allocated for cattle- and carabao- raising projects.

2. LBP Cattle Dispersal Program, 1981

Objectives:
a) To increase incomes of farmers by cattle breeding and fattening;
b) To facilitate the dispersal of the breeding cows' offspring.

Beneficiaries:
a) Farmer breeders
b) Cattle fatteners

Conduit : Masaganang Sakahan, Inc. for technical support and mechanics of dispersal

3. LBP-Rural Banks-Farmer Cooperatives Credit Program, 1990: Livestock Component

Objective : To provide credit services to farmers with RBs and farmer cooperatives as conduits.

Beneficiaries : Livestock raisers, preferably organized into cooperatives

E. Bakahang Barangay-Supervised Credit Program

The Bakahang Barangay-supervised credit program was designed for backyard cattle raisers. The program was an offshoot of the Central Bank-Department of Agriculture Livestock Loan Fund Project, conceived specifically for small farmers who undertake backyard cattle-raising activities. In 1987, the scheme was consolidated into the Comprehensive Agricultural Loan Fund (CALF) program.

1. Short-Term Bakahang Barangay Fattening Program, 1978

   Objective : To provide additional income for small backyard cattle raisers

   Program Funds : P18 million

   Lending Channels : Rural banks

   Beneficiaries : Small backyard cattle raisers.

   Loan Ceiling : Loan requirement for 10 heads (P10,000)

2. Medium-term Cow-Calf Loan Program, 1981

   Objectives:

   a) To increase the cattle breeder base;
   b) To improve the genetic make-up of the local stock.

   Program Funds : Seed money allocated to the BAI from the Ministry of Agriculture.

   Beneficiaries : Livestock growers who have the required sources of forage and housing facilities.

   Loan Ceiling : Requirements for one breeder and three fatteners.

   Additional Services : BAI veterinary services and artificial insemination (AI).

F. Community Development Assistance Program (CDAP), 1982

The CDAP was a financial assistance program for small farmers in depressed areas. Cattle fattening was identified as one of the activities for financing assistance.

Source of Fund : USAID

Beneficiaries : Small backyard cattle raisers.

Loan Ceiling : P3,500 on the value of the stock.

Interest Rate : 4% per annum

G. National Livestock Production Program, (NLPP), 1987

The NLPP replaced the Cattle Dispersal Program of the BAI. Beyond cattle dispersal, the program was designed to increase the production of cattle in the different regions in the country.

Source of Funds: Comprehensive Agricultural Loan Fund

Scheme: Young heifers are dispersed to backyard raisers, fattened until pregnant, and whose proceeds from sale are divided on a profit-sharing basis. Pregnant cows are brought back to the government stock farms. After their delivery, the cows are dispersed back to the small farmers to be raised as breeders.

H. Government Program for Animal Industry Development, 1990

The government program for the animal industry development is aimed at upgrading the productivity and profitability of the livestock industry. The program, with an allocation of P663 million, includes the acquisition and upgrading of facilities, equipment and other livestock production infrastructures, and undertaking research on livestock investment opportunities. The program also envisions the establishment of an indigenous dairy industry.

Allocation of Funds:

1. Comprehensive Animal Industry Development Program : P340.5 million
2. Philippine Livestock Development Program : P199.6 million
3. National Dairy Development Program : P122.9 million

I. The Comprehensive Agricultural Loan Fund (CALF): Livestock Component, 1990

Prior to 1986, the government had 39 separate commodity- based subsidized credit programs for agriculture. In 1986, the CALF was established to operate as a guarantee fund to service accredited lending institutions. The CALF consolidated a number of these programs into a single lending and guarantee facility (Dimaano 1990).

Of the CALF-backed guarantee programs, the small- to medium-scale livestock and feedmilling sector guarantee needs were taken up by the Guarantee Fund for Small Medium Enterprises (GFSME) whose client conduits were mostly non-government cooperatives and associations. The relative participation of the cattle industry cooperatives in terms of guaranteed funds received is shown in Table 2. Note that cattle fattening involvement in this scheme has yet to significantly expand in terms of the number of cooperatives participating, as well as in the magnitude of the funds availed of.

J. The Multi-Livestock Dispersal Loan Program (MLDLP) 1988- Present

The MLDLP was launched by the Department of Agriculture (DA) in 1988. The National Agriculture and Fishery Council (NFAC) was mandated to provide funds for the BAI to implement the program using the RBs as conduits. The program adopts the general supervised credit scheme, but has become multi-commodity in scope. The program has also been made available to institutional borrowers (e.g., cooperatives). In the short term, the major objectives of the MLDLP include the following:

a) To increase the production of beef;
b) To provide farmer-borrowers access to credit;
c) To increase farmers' incomes; and
d) To enhance the active involvement of the private sector.

Table 2

Guaranteed Loans to the Livestock Sector under the GFSME-CALF Program, 1990

Project	Participants	Loan Amount (in million pesos)
Feedmilling	3 livestock/poultry cooperatives	42.000
Cattle fattening	2 cooperatives	0.890
Hog raising	3 cooperatives	0.828

Source: Dimaano, 1990

GFSME - Guarantee Fund for Small Enterprises

CALF - Comprehensive Agricultural Loan Fund

Table 3

Indicators of the MLDLP Coverage, 1990

Item	Indicator
Loanable funds (LF)	₱21.5 million
Loan ceiling	₱15,500 per borrower
Number of beneficiaries	1,641 borrowers
Number of animals financed	2,561 animals
Area coverage	15 provinces
Collection rate	53 percent
Projected funds available plus additional committed funds for 1990	₱112.2 million

Source: Dimaano, 1990

MLDLP - Multi-Livestock Dispersal Loan Program

The loan is secured by chattel mortgage on the animals financed and by loan guarantee and insurance by the Philippine Crop Insurance Corporation (PCIC).

About P52.7 million was allocated to the DA budget under the MLDLP in 1990 for expanding the cattle breeder stock. In 1991, about P100 million in additional funds is expected for further expanding the country's cattle breeder base.

Some indicators of the MLDLP performance as of April 1990 are shown in Table 3. The huge number of beneficiaries and animals financed attests to the government's concern about arresting the decline of the cattle population by widening the coverage of programs for expanding the cattle breeder base. Whether the program can make a significant development in the industry depends on the percentage of breeding animals served as a percentage of the country's entire breeding stock.

K. Remarks

The sheer number of programs and the significant amount of funds infused into the cattle industry from 1975 to 1990 reflect the government's unqualified support for the industry. Thus, the decline of the cattle industry during the past decade cannot be attributed to the government's systematic neglect.

In general, the programs' thrust was two-fold: to increase the production of beef, and increase the income of farmers by providing them with an additional preoccupation (or "sideline activity" as it is commonly called). It was only in recent years when the objective of increasing the cattle inventory throughout the country became an overriding concern.

Another salient feature of the government programs for the cattle industry was the concentration on cattle dispersal to small backyard farmers. The cattle dispersal program assumed that there was always cattle to be dispersed, and that a source of feeder calf could always be found with minimal cost.

While programs proliferated for small backyard enterprises, the same could not be said for commercial cattle activity, particularly those being undertaken under pasture lease agreements. The ramifications of the lack of attention given the non-backyard sector of the cattle industry have been strongly felt in the MLDLP.

The MLDLP has become the most comprehensive financial assistance loan scheme as far as the cattle industry is concerned. While the demand for inclusion into the MLDLP grew and the coverage of the program expanded, the lack of stocks from the cattle ranches to disperse to small farmers has temporarily stalled the further expansion of the program (Dimaano 1990).

The declining cattle breeding base and consequent growing scarcity of feeders were some of the focal concerns expressed in the Philippine Livestock Sector Program Study (Winrock 1991).

Faced with constraints imposed by the slow rate of feeder cattle production in the commercial farms, an alternative to produce feeder stocks in the backyards themselves has been conceived. Whether or not the backyard farms can meet the growth in demand for feeder stocks as rapidly as the MLDLP would have it, given their current feed resources and structure of production, is debatable. The recognition of the shortage of stocks in the ranches for the MLDLP program

strongly indicates the problem of declining cattle stocks in the country, particularly in the commercial farms. Thus, this problem needs to be seriously addressed.

C. *The State of the Cattle Industry in the Philippines*

Cattle numbers in the Philippines reached their peak in 1982. Since then cattle stock has started to decline steadily (Alo 1990). From 1986, the pace of depletion of the cattle stock accelerated. The comparison of the movement in cattle population from 1986 to 1990, between backyard and commercial scales of activities, is shown in Table 4.

A fast rate of depletion has been observed to have occurred in the commercial sector. The backyard sector, on the other hand, had remained stagnant throughout. The standing stock, estimated at 1.6 million heads by the Bureau of Agriculture Statistics (BAS), has been labelled by the private sector as overstated. As early as 1988, the private sector estimated the cattle population at only 800,000 heads (Nazareno 1990; Sumilang 1990; CRC 1990).

Government authorities on livestock, however, maintain that the private sector's alarmingly low estimate of the cattle population reflects its demand to allow the importation of a higher number of feeder cattle than the current quota.

Indeed the importation of feeder cattle had steadily grown from 1987 to 1990 (Cabanilla 1991). Although data from the National Statistics Office (NSO) and the Livestock Development Council (LDC) differ, Table 5 gives an indication of the growth in demand for imported feeder stocks for supplementing domestic supply from the commercial farms.

Two technologies of cattle production are dominant in the Philippines: the backyard and commercial systems. The backyard activities are more or less homogeneous in technology, mostly characterized by the fattening of a couple or more heads of cattle, by feeding them with crop residues, farm weeds and grasses (Perilla 1984, Cabanilla 1983).

Commercial activities, meanwhile, fall into two broad categories with respect to tenure on land. On the one hand are the privately-owned ranches with highly developed production technologies (e.g., Monterey, Del Monte, Philippine Genetic Inc., etc.).

These are characterized by intensive pasture management and the achievement of relatively high stocking rates. On the other hand are commercial farms operating under pasture leases which consistently exhibited extremely slow investments in pasture improvement (Yazman, 1991) and horrendously low stocking rates (Quisumbing 1987).

Still on the commercial side, minor participants or firms also operate on a medium scale, undertaking intensive feedlot fattening and/or cow-calf operations. The capacity of the feedlot fattening sector to contribute to beef output, however, still depends on the rate at which feeder cattle can be secured domestically given the quantitative restrictions on feeder stock imports. Again the crucial role of breeding and feeder calf production under commercial scale stands out.

Medium-size commercial cow-calf operators under intensive private pasture management may likewise be said to be keeping abreast with the growth in demand for feeder stocks. But their capacity to expand has been limited by the lack of feeder stocks from the commercial as

Table 4

Cattle Inventory in Backyard and Commercial Farms, Philippines, 1986-1990

Year	Backyard No.	% Change	Commercial No.	% Change	Total No.	% Change
1986	1,503.6		310.9		1,814.5	
1987	1,496.3	(0.5)	250.5	(19.4)	1,746.9	(3.7)
1988	1,489.5	(0.5)	210.5	(16.0)	1,700.0	(2.7)
1989	1,501.8	0.8	164.0	(22.1)	1,665.8	(2.0)
1990					1,629.0	(2.2)

Source: Bureau of Agricultural Statistics (BAS), 1990

Table 5

Importation of Feeder Cattle, 1987-1990

Year	NSO Data	LDC Data
1987	700	2,261
1988	3,199	12,035
1989	15,003	21,984
1990	-	21,313

Source: Cabanilla, 1991

well as backyard farmers. Thus, in terms of technology and performance, the two sectors that need closer attention are the backyard cattle raising and pasture lease sectors.

1. *Backyard Fattening*

Backyard cattle fattening has always been regarded as a profitable activity, the main investment being the feeder calf itself. The raising costs are almost nil because the cattle could be fed with crop residues and roughage. The main problem often cited for the non-occurrence of a corresponding heavy entry by firms into the industry is the limitation of liberal credit services which cater to the cashflow patterns of small farmers (Molina 1990).

Whether or not credit availability is the main bottleneck remains to ascertained. The historical facts pertaining to the proliferation of the supervised and other liberal credit programs accorded the backyard cattle industry from 1975 to 1990 do not cite credit availability as the primary culprit in the backyard cattle sector's failure to expand.

2. *Pasture Leases*

To date not much is known about the current state of the pasture leases in the Philippines. A detailed description of the real performance of the pasture leases is unavailable. Holders of PLAs are in fact required, by the terms of the contract, to submit pasture development plan as well as annual reports to the Department of Environment and Natural Resources concerning the rate of investments in the lease and the growth in the stocking rate.

The DENR in recent years has experienced a secular decline in the submission of PLA reports. Reports have it that less than 40 percent of PLA holders actually submit records, whose reliability is open to question, and that not all of such reports reach the central office. As a result, investments account for less than five percent of all PLA holders (Yazman 1990).

The distribution of PLAs among the regions according to number, area, and average sizes as of May 1991, is shown in Table 6. Pasture leases proliferate mostly in the Luzon and Mindanao islands. In Luzon, Regions II, IV and V account for 70 percent of the island's total PLAs, with Regions II and IV gaining 204 and 201 PLAs, respectively. Regions X and XI lead the other areas in Mindanao, combining for 88 percent of the total PLAs in the island.

In terms of total area under PLAs, Regions II, IV and V again are tops in Luzon, accounting for 72 percent of the total. In Regions II and IV alone, about 77,000 and 70,000 hectares of PLAs, respectively, are present.

In Mindanao Regions X and XI likewise occupy the largest PLA area, together accounting for 75 percent of the 106,000 hectares under PLAs in Mindanao.

On the whole, the average size of PLAs is highest in Mindanao at 540 hectares, followed by Visayas at 380 hectares, and lastly, Luzon at about 350 hectares per pasture lease. For the entire country, the average size of a pasture lease is nearly 400 hectares.

Stocking Rates. The rate at which the pasture leases are currently stocked is not exactly known. Previous estimates of the average stocking rates in PLAs were put at 0.2 animal units per hectare (Quisumbing, 1987). A fully-grown cow, bull or heifer (more than three years old) is equivalent to one animal unit (a.u.). Under improved pasture conditions, the stocking rate can be

Table 6

Distribution of Pasture Leases by Region, 1991

Area Region	Number of PLAs	Area ('000 ha)	Average Size (ha)
CAR	86	26.4	307.0
I	56	14.0	250.0
II	201	69.5	345.6
III	75	31.0	413.2
IV	204	76.7	375.8
V	110	37.6	341.5
Luzon	732	255.2	348.6
VI	28	8.3	296.5
VII	13	7.1	542.8
VIII	2	0.8	420.0
Visayas	43	16.2	376.7
IX	2	2.8	1,398.0
X	88	30.2	343.5
XI	86	49.0	569.5
XII	22	24.1	1,093.0
Mindanao	198	106.1	535.9
PHILIPPINES	973	377.4	387.8

Source: Department of Environment and Natural Resources, 1991

increased to 2.0 a.u. per hectare (PCARRD 1985). Well-managed pastures can carry up to five a.u. per hectare (Yazman 1991).

To have a rough idea of the current PLA stocking rates, the ratio of the commercial cattle population to the area utilized under PLAs could be obtained. The initial assumption is that all cattle under the PLAs are classified as commercial. Not all commercial farms, however, are undertaken in the pasture leases. Thus, the figures obtained by taking the ratio of the commercial cattle population to the area under PLAs should be considered as overestimates of the true average stocking rates.

The distribution of the commercial cattle population among the regions (except CAR) is shown in the second column in Table 7. The ratio of the commercial inventory to the respective areas under PLAs is given in the third column.

The exercise reveals that only in two out of 12 regions is the ratio greater than unity. The highest ratio was obtained in Region V, which includes Masbate, considered the cattle center of the Philippines. The lowest ratios of 0.18 and 0.21 are in the two regions of Mindanao (XII and IX), where the average sizes of PLAs are highest (1,093 ha and 1,398 ha, respectively).

The national ratio is 0.56, with Luzon having 0.64, Visayas 0.56 and Mindanao 0.35. Again, it must be borne in mind that these ratios are gross overestimates of the true stocking rates in the PLAs. If half of the total commercial cattle population were under the privately-owned commercial ranches, then the true national stocking rate of the PLAs would drop to half the computed ratio of 0.56. Thus, the previous estimate of a very low stocking rate of 0.2 animal units per hectare in the PLAs is not farfetched.

D. *Perceived Problems in Cattle Production in the Philippines*

Two problem areas in the cattle industry have been identified: the backyard and pasture lease sectors. These sectors will be treated separately.

1. *Backyard Cattle Raising*

Most studies pertaining to the cattle industry in the Philippines have focused on the backyard cattle raising activity by virtue of its dominance and proliferation in the industry. The perceived problems in back yard cattle raising may be divided into two themes: credit and production, as these come out as the most common areas of concern in the literature.

Credit. Most of the studies on backyard cattle cite the availability of credit as one of the main reasons for the backyard fattening activity's inability to expand (Mangum 1991; Molina 1990; Dimaano 1990; DA 1990; Perilla 1984; De Mesa 1983; Medel 1983). The principal credit problems follow:

- **Inability to meet collateral requirements.**

Backyard growers have meager resources and assets to be used as collateral. Thus, access to regular institutional banking services is limited (DA 1990; De Mesa 1983; Tamayo 1979; DBP 1979).

Table 7

Regional Distribution of the Commercial Cattle Population and its Ratio to the Areas under PLAs

Region	Commercial Population (1988) ('000 heads)	Population/ PLA Area Ratio
CAR	-	-
I	11.22	0.61*
II	26.95	0.29*
III	26.37	0.85
IV	29.75	0.39
V	69.82	1.86
Luzon	164.11	0.64
VI	3.55	0.42
VII	4.63	0.65
VIII	0.82	1.03
Visayas	9.00	0.56
IX	0.58	0.21
X	13.64	0.45
XI	18.84	0.38
XII	4.37	0.18
Mindanao	37.43	0.35
Philippines	210.54	0.56

Source: Department of Environment and Natural Resources, 1991

Bureau of Animal Industry, 1990

*Pro-rated to include pasture lease agreements (PLA) areas in the Cordillera Autonomous Region (CAR).

- **Dependence on government special credit programs for financing.**

The entry of government-backed credit programs for backyard cattle raisers may be a manifestation of some kind of market failure in terms of reconciling the credit needs of backyard raisers and the requirements of credit suppliers. One problem singled out as arising from the dependence on specialized credit programs from the government is the high transactions cost incurred by prospective borrowers. It comes in the form of voluminous paperwork to be accomplished and a long waiting period to boot before the papers are finally processed and approved (Dimaano 1990).

Production. The production problems confronting backyard raisers have so far received lesser attention from industry analysts than the credit issue. Despite the apparent insignificant cost of maintaining and fattening a couple heads of cattle, using mainly crop residues as feed, the nagging question remains: Why are small farmers not flocking to the business? Production-related issues are discussed below:

- **Cattle raising as merely a "sideline activity" or cattle as a convertible asset during emergency situations.**

Generally, small farmers raise cattle not mainly for business purposes but as a "sideline activity" (i.e., momentary income-generating preocuppation) that serves as a readily encashable source of fund in times of emergencies (Molina 1990).

Such a stance has a strong bearing on the management of cattle. The non-elevation of cattle raising as a business in its own right does not favor the normative goal of striving for the highest expected profits in terms of feeding the animal and determining the optimal length of time within which it is raised.

The attitude of considering one or two heads of cattle as a "piggy bank," which can be readily converted into cash during an emergency, also draws away attention from raising the animal from a strictly entrepreneurial point of view.

As long as backyard raising is not primarily considered as a veritable business activity, then government incentives to induce a more rapid growth of the cattle stock may not produce the desired results.

- **Indifference to improved cattle fattening technologies.**

As long as the animal achieves an acceptable rate of gain in weight from the viewpoint of farmers, technologies which hasten average daily gain, but which may entail additional financial and/or labor cost, are unlikely to be sought or even seriously considered (Molina 1990). The pursuit of new technologies for raising cattle, plus weighing the risk of loss from the use of new methods, do not normally preoccupy the small farmers.

Caution, however, should be exercised in labeling the attitude of farmers as one of "indifference." Given the current resources and credit opportunities and constraints, the non-adoption of new feeding technologies may be the most rational choice to make. Furthermore, it remains a question of whether the technology is in fact a distinct possibility within the physical and human capital resources of the small farmer.

- **Partiality to cattle fattening over cow-calf operations.**

Given the observation that the commercial pastures' capacity to supply feeder cattle to the backyard sectors has declined over time, the preference of small farmers to engage in fattening activities to cow-calf or breeding operations further limits the capacity of the system to produce feeder calves for its own use. The attractiveness of cattle fattening over cow-calf operations has been attributed to the fact that the former has a shorter pay-off period (Molina, 1990). In the event that small farmers' discount rates are high, shorter-term activities will be preferred, all things equal.

- **Shortage of feeder cattle from the pasture.**

The current shortage of feeder cattle has given rise to increasing prices of feeder calves. By far, this has been identified as the most serious constraint to the expansion of fattening activities in the backyards. Unless the quantitative restrictions on the importation of feeder cattle are lifted, the industry will experience for some time a shortfall in fattening calves in the livestock sector (Winrock International 1991).

2. *Commercial Operations in Pasture Lease Agreements*

The recently concluded Livestock Sector Program Study by the Winrock International (1991) documented the perceptions of cattle ranchers in Regions III, IV and X regarding the constraints faced by the commercial ranchers under PLAs. The problems were identified and ranked according to importance (Yazman 1991):

a) Uncertainty of tenure due to the Comprehensive Agrarian Reform Law (CARL);

b) Intrusion into the pasturelands by squatters;

c) Unfavorable peace and order situation;

d) Lack of long-term loans, high interest rates, and stringent collateral requirements;

e) High cost of materials for investment in PLA improvements; and

f) High risk of diseases (e.g., hoof-and-mouth) and costly animal health maintenance.

Uncertainty of tenure due to the CARL. The matter of security of tenure with respect to the privately-owned cattle ranches was resolved by the Supreme Court of the Philippines in March 1991. Private cattle ranches are to be exempted from the provisions of the CARL. On the other hand, the security issue still hangs over the lands covered by PLAs as these are public lands, which, in accordance with the 1987 Constitution, are subjected to agrarian reform.

The main objection to subjecting cattle ranches to agrarian reform, whereby the land is to be divided into parcels no larger than three hectares, is the claim of the existence of economies of scale in cattle ranching (Abad 1990; Alo 1990; Abellada 1988). Compared to Indonesia, Thailand and Taiwan, the average size of PLAs in the Philippines is smaller. Taiwan is said to have exempted cattle ranches from land reform (Abellada and Castasus 1989).

The other objection is its running counter to a widely-accepted reality: feeder production and breeding, through the extensive use of land, requires only modest investments. Breaking up the land into smaller-size parcels needs significantly higher investments in pasture improvement and physical infrastructures. This, it has been claimed, will put pasture leases and its maintenance beyond the reach of medium-scale entrepreneurs (Abellada 1988).

Intrusion into pasturelands of squatters. This arises from the inability of the DENR personnel to enforce property rights over an extremely vast area under the department's jurisdiction. The DENR also administers and is supposed to enforce property rights of Timber License Agreement (TLA) holders over forest lands, far wider in area than the pasture leases. There are cases, it has been perceived, that lands over which rights granted to PLA holders overlap with areas over which Integrated Social Forestry Program (ISFP) rights have been granted to upland dwellers. Where the court cases involving such conflicts drag on, the ranchers involved simply liquidate their herds and give up their PLA rights (Yazman 1991).

Unfavorable peace and order situation. Situating PLAs in the hinterlands where the peace and order situation is largely unfavorable has historically driven away ranchers from the pasturelands (Cabanilla 1989). In other cases, the ranchers have to establish a *modus vivendi* with the insurgents (Yazman 1991). If a typical PLA covers a wide area of some 400 hectares, then the monitoring of insurgency activities poses a problem. And if the enforcement of rights is undertaken at the expense of the rancher, the costs of operation can be prohibitive. Thus, a *modus vivendi* with the insurgents involving some kind of "taxes" offers the least "discomfort."

Lack of long-term loans, high interest rates, and stringent collateral requirements. Pasture land improvement and cattle breeding are a long-term investment. Where equity capital is not readily available, the nature of the activity requires long-term loan facilities. High interest rates are biased against front-loaded investments, in which the benefits are reaped only later into the future.

The PLAs' unacceptability as collateral by the regular commercial banks (DBP, 1979) may explain the granting of special credit programs to PLA holders at a certain point in time.

High cost of materials for investment in PLA improvement and physical facilities. The main investment expenditures in pasture improvements are fences and barbed wires. The wider the PLA, the bigger the material expenses. Coupled with high interest rates, the high cost of investments in ranches drag the expected net benefits. Furthermore, if operations are to be undertaken under a cloud of uncertainty over tenure, it is understandable for the investments to be postponed.

High risk of diseases and costly animal health maintenance. The country has yet to eradicate the hoof-and-mouth disease. The serious consequences of an attack of the disease on the animals and the high cost of veterinary services are real factors which decrease the expected net benefits to cattle ranching (Winrock International 1991).

E. *Cross-country Comparisons*

1. *Asian Experience in Ruminants in the Tropics*

Few success stories in cattle production abound in tropical Asia (Fine and Lattimore 1982). While non-ruminant economic activities showed remarkable expansion in recent years, no comparable trends in the ruminants sector has been observed.

Thailand, between 1970 and 1979, experienced close to one percent decline per annum in cattle stock, even as demand for beef grew by about five percent per annum during the same period. Given the strength of demand and the availability of low-cost feeds, the stagnation of the cattle inventory was deemed as surprising (Tokrisna and Panayotou 1985).

Essentially, the ruminants sector in Asia can be described as having two main problems: very low productivity, and feed resource limitations.

Productivity. Ruminant systems in tropical Asia are marked by extremely low offtake ratios, about 50 percent of the world's average. The widespread use of cattle for draft power encourages the holding of the animals until an advanced age. For the same reason, female productivity is drastically impaired (Jarvis 1982).

The integration of cattle holders with subsistence or near-subsistence farming allows little flexibility for technical change which requires drastic alterations in animal use. The structure of cattle and farm relations limits the pursuance of specialization in functions to achieve higher productivity and the consequent profit possibilities (De Boer 1976).

Feed Resource Limitations. The real limitation in ruminant production in tropical Asia is two-fold. On one hand, the grasses and weeds that grow are extremely varied, making a systematic assessment of their nutrient value difficult (De Boer and Welsch 1977; Winrock 1978; Fitzhugh and De Boer 1981). On the other hand, ruminants are heavily dependent on the domestic land resource. Thus, the role of crop residues in supplemental feeding for cattle comes in. But as long as the small farms, into which the cattle are integrated, are also low in productivity, the limitations on feed resources will remain a constraint to the expansion of the cattle stock.

Directions in Ruminant Production. There is a need for long-term programs for improving the productivity of both the ruminant and non-ruminant sectors in tropical Asia. A concentration of development efforts on the non-ruminant activities aggravates the comparative position of the ruminant sector vis-a-vis the other (Cabanilla 1989).

Within a farming systems framework, the conflict between draft power and beef potentials of cattle must also be thoroughly assessed. The development of alternative draft power sources may help free the cattle for breeding purposes. Moreover, specialization into beef production would be strengthened (De Boer and Welsch 1977).

The fundamental relationship within farming systems in smallholder farms requires that the ruminant problem be approached holistically, not as a single specific activity. Feed resource limitations in small farms must be addressed by devising strategies for increasing the nutrient supply in the farms themselves. This needs concomitant advances in crop productivity. To raise

both crop and ruminant production potentials, a certain degree of specialization of functions should be attained.

The increasing pressures on land work against the undertaking of complete production cycles for ruminants in the small farms. The animals require a land base greater than that needed for non-ruminants. The specialization of functions necessitates that, as small farmers are most efficient on the fattening aspect of the activity, the breeding and calf-rearing functions may have to be undertaken in the more modern and expan sive ranches. The finishing functions may be turned over to feedlotters specializing in the use of feed concentrates for rapid weight gains to increase the average slaughter weights of the animals.

2. *South Korea*

The Shift from Draft to Beef: 1965-1980 (Jarvis 1982). Since 1965, beef output in Korea has rapidly expanded to about 10 percent every year, responding to rising real incomes and a moderately high population growth. Within 10 years the native herd grew from 1.25 million in 1971 to 1.9 million by 1981. The specialized beef herd expanded significantly during the same period, with about 75 percent being accounted for by the native herd alone. While imported stocks existed, the native herd had managed to hold its own ground.

As the herd expanded, the average slaughter weight also rose from 100 kilos to 203 kilos. The herd expansion went up at 34 percent, and slaughter expansion at 30 percent, the difference going to further herd build-up.

Lewis (1982) maintained that the rising prices of beef were the main incentive in the shift in the raising of cattle from draft to beef. Higher prices prompted earlier slaughter. Although earlier slaughter would have meant lower slaughter weights, the output price incentive also induced the farmers to feed the cattle with large rations of concentrates, and exploit the profit opportunities until the marginal revenue product from feeding declined to a point of equality with the marginal factor cost of concentrates.

The small farms in Korea, through time, could not keep up with the rapid expansion in demand for roughages and concentrates. Thus, increased beef production had to depend partly on the growth of imported feed concentrates.

It was then projected that the supply of bullocks for draft would decline as the available roughage and crop residues from the small farmers had to be devoted increasingly to maintain the expanding breeding cows. In terms of resource use, the South Korean small farms developed a dual resource use and feeding pattern. The limited crop residues and roughages were allocated to the expanding breeding stocks. The fattening animals for slaughter were fed with concentrates, both domestically produced and procured overseas. With the high opportunity cost of feeds, draft power had to be sourced elsewhere in mechanical power.

Remarks. The Korean experience shows that a strong cattle and beef industry could be founded on the basis of small farms and the native cattle. The output price incentive, however, has to be present to raise the opportunity cost of holding the animal for a longer time, thus allowing a faster turnover of the fattening herd.

With a more intensive raising of cattle under small-farm conditions, it is necessary to exploit fully the interrelation between cattle raising and crop production. The reallocation of farm feed resource among draft animals, breeding cows, and fattening steers according to opportunity-cost principles reveals that the basis for the expansion of both the cattle production and slaughter is exploiting the profits from the cattle-raising activity. The failure to consider cattle-raising as an enterprise in itself would not spark the entrepreneurial imagination of small farmers to determine the most efficient use of resources produced within the farm itself or the by-products in crop production.

Finally, to achieve a significant increase in slaughter weights and at the same time lower the slaughter age, the possibility of producing cheap concentrates at the farm level should be diligently pursued. As commercial concentrates and beef price ratio increases, the development of the technology and specialization in transforming farm crop residues into feed concentrates must likewise be vigorously followed through.

Small Cattle Farm Structure: 1980-1981 (Suk-Lin-Cho 1988). By virtue of the South Korean Land Reform Law of 1950, all farm lands were limited to a maximum of three hectares. In 1987, the average farm household cultivated only about 1.1 hectares of land, with about 64 percent of all farm households holding less than a hectare of farm land (Young Kun Shim 1988).

Most farms are engaged in short-term cattle fattening with no on-farm breeding. The annual herd size per farm is about eight heads, or four heads during each six-month fattening rotation. Purchase weights were about 270 kilos, and slaughter weights at about 410 kilos, an average weight gain of 140 kilos per head in six months, or an average daily gain of 0.73 kilos.

Given the small farm sizes, the optimal size of herd was pegged at heads, the average annual size. Beyond eight heads per year, no economies of scale were evident as 85 percent of raising costs were relatively fixed, composed of the purchased calf (70 percent) and concentrates (15 percent). Opportunities for cost reduction were found to lie on improvements in technical efficiency rather than increasing the size of the herd.

Responsiveness to output price changes in the short run was tested. Inventory was found to react positively to price, but the contrary was true for beef supply. This reveals that the projected gain from future output through investment in additional livestock outweighed the immediate gain from early slaughter due to a higher output price.

Remarks. The intensive use of small farms for beef production in the South Korean experience shows that certain opportunities could be applied to Philippine farms. That the one-hectare farms are able to support eight fattening cattle per year, or four heads simultaneously per six-month cycle, attests to the backyard farms' ability to reach their "carrying capacity" in terms of supporting the maximum number of cattle a typical farm can hold. While Korean and Philippine demand conditions and farm capacities are far from identical, the Korean experience presents an opportunity for expansion in both crop and livestock raising.

The Korean farms' non-engagement in on-farm breeding points to the specialization that has taken place in the Korean cattle industry. It may also lead to the possibility of the Philippine small farms' suitability for pure fattening rather than breeding and feeder calf production. This

may be an affirmation of the ranches as the most efficient alternative to perform breeding functions.

III. DIRECTIONS FOR RESEARCH

A. *Smallholder Backyard Cattle Fattening*

The literature on Philippine as well as Asian cattle production teems with descriptions of smallholder cattle raising. On the one hand, a rather pessimistic outlook is common with respect to the prospect of increasing the cattle stock via smallholder operations. Feed resource constraints, low productivity in the cropping side of farming, poverty, lack of material resources of small households, and competing uses of cattle are seen as formidable stumbling blocks to the cattle stock's expansion.

The South Korean experience, however, reveals that such objectives as bigger cattle population, larger number of cattle slaughtered, and higher slaughter weights could, in fact, be achieved simultaneously. To encourage farmers to adopt productivity-raising technologies, it is imperative for the market to be allowed to work to reflect the scarcity value of beef. It is important again to note that the Korean feats were achieved under conditions of typically small farmholdings. A high degree of specialization of functions was seen as a prerequisite.

The common approach to introducing new technologies in backyard cattle raising comes in the form of farm budgets evaluating the financial and economic returns to recommended feeding rations. The feed resource constraints to ruminants raising, as recognized in the tropical setting, point to focusing research directions on generating alternative feed resources.

The traditional backyard modes of cattle raising, while not demanding in feed resources, yield very low average daily gains (ADG) in weight. This leads to a low classification in beef quality and, consequently, a low price per kilogram liveweight at the moment of sale (Costales 1990).

On the other hand, cattle-fattening technologies for raising the ADG in weight involve the adoption of improved rations. Such rations, however, require the purchase of significant amounts of commercially marketed feed concentrates like corn, rice bran, copra meal, and spent grain. Under the typical backyard farm income flows, extra cash for regular expenditures on feed concentrates is out of the question. Thus, the high input-high output cattle-fattening activities are normally found in the medium-scale feedlot fattening activities, and rarely in the backyards.

The most promising direction for raising cattle productivity in the backyard approximating the Korean farm-carrying capacities is the development of integrated intensive cropping-backyard cattle fattening systems which complement each other. The task involves the documentation of animal nutrition studies pertaining to the respective nutritive values of various crop residues, and the treatments involved in maximizing their nutritive potential. In the same vein, this also involves the identification of profitable cropping systems which are favorably responsive to organic fertilization technologies, of which animal waste utilization is a valuable complement.

Another direction may be the utilization of animal nutrition- based technologies for the treatment and processing of crop residues into nutritionally valuable feed concentrates for cattle fattening. Ultimately, the maturing to specialization and commercialization of these technologies in the rural sector in the spirit of small- to medium-scale entrepreneurship must be the goal.

B. *Commercial Operations Under Pasture Lease Agreements*

While a great deal of literature has been devoted to the problems of smallholder cattle raising to explain the declining cattle population in the Philippines, little attention has been given to cattle production and its dynamics in the public pasturelands. In the Philippines, this should be surprising as significant areas of grazing lands are under pasture leases. Also in the Philippines, while the perceived problems associated with the decline of cattle activity in the pasture leases have long been expressed, there is presently no local theoretical work which provides a framework for addressing these problems conceptually.

Specifically, the disinvestment that transpires in the pasture leases may be approached within the "property rights" framework. While formal lease rights are granted over large tracts of land over a reasonably long and definite period of time (25 years, renewable for another 25 years), property rights have apparently not been enforceable. If at all, enforcement could be done only at highly prohibitive costs.

While concomitant responsibilities are attached to the privilege of holding pasture leases, the penalties on the reneging of responsibilities by rights holders as stipulated in the contracts have yet to be imposed.

The advent of the CARL has, no doubt, compounded the property rights problem. The non-resolution of the fate of the pasture leases introduces uncertainty over property rights previously granted. Under this environment, the resource moves toward obtaining a public or common property character. Not only are new investments postponed; prior investments in cattle stocks may be capitalized, and the remaining pasture grasses may simply be "mined."

The rights owners do not, however, leave the industry by renouncing their claims. Meanwhile, the resource remains underproductive.

Exempting the pasture leases from the CARL to bring back life to the cattle industry is being disputed, citing the presence of other problems associated with the holding of large pasture leases.

The prohibitive costs of enforcing rights against squatters and insurgents in the absence of public protection would make underinvestment in the pasture leases the rational option. And as incomes from the pasture fall, the more diminished will be the willingness to reinvest, and the more likely will the pastureland be abused for short-term gain. Such was the case in agricultural activities on common property resources in Nepal (IFPRI 1989).

The pasture leases are obviously underpriced at one peso per hectare every year. For an average size of 400 hectares of pasture lease granted, the leaseholder has almost no stake if the rights were cancelled due to low investment in improvements being made. The cattle being raised could always be capitalized.

If the price of the resource fails to adequately reflect its scarcity premium, the resource would be expected to be exploited in such a manner as though it had very little societal value. The profit-maximizing solution in the short run may indeed yield to choices which are socially sub-optimal. In these instances, investments in technology offering higher pasture grass output as well as higher rates of cattle reproduction would take the backseat.

What, then, should be done to the pasture leases? If only for eliminating the uncertainty factor, the DAR and DENR must come up with a definitive statement on the fate of the PLAs. The rather complicated problems associated with insurgency and squatting, plus the prohibitive costs of enforcing property rights on expansive areas of land suggest that ranching operations would be more manageable if the PLA sizes were smaller than they currently are.

It remains to be asked whether it makes sense for the DAR and DENR to intervene in the pasture leases to effect adjustments in the cattle ranching sector. From the perspective of economic efficiency, the question boils down to ascertaining the pasture leases' comparative advantage in the breeding and production of feeder calves for the backyard sector. Otherwise, the question of intervening in the pasture lease is moot and academic. This means that it is best for the Philippines to import the feeder calves to fatten.

To date, there are no authoritative studies establishing the comparative advantage of these activities in the pasture leases. In the absence of adequate information, it would be interesting to pursue the task of determining the comparative advantage of breeding and feeder calf production under improved pasture lease.

In cases where it is reasonable to intervene in the pasture leases, some questions crop up: What would be the ideal size of a pasture lease? Up to what size do the economies of scale cease to exist? What is the optimal size of a lease, beyond which property rights become difficult and expensive to impose? What herd size would be necessary to warrant specialization in breeding and calf-rearing? Currently, no easy answers to these questions are available.

Prototypes of pasture leases, of different sizes and of varying efficiencies should thus be documented and studied. At present, there are 100-hectare pasture improvement and breeding modules prepared by consultants to the DA, which can viably be stocked with 250 heads of cattle, and projected to operate over a 20-year period. The modules exhibit positive discounted financial and economic net benefits at current interest rates (Winrock 1991). While the assumptions of the modules should be subjected to consistency with actual conditions in the pasture lease agreements, the modules simply show that cattle production activities undertaken in ranches, one-fourth the current average size of pasture leases, could under certain conditions exhibit positive discounted net benefits. It would also be interesting to determine the test conditions under which such modules would remain above water.

It is also imperative to determine the premium price of the privilege to operate private pasture leases. A fixed land rent scheme may, in fact, be devised so as not to distort the profit-maximizing decisions of pasture lease holders. More imaginative schemes may employ the disposition of various sizes of pasture leases by means of bidding.

One of the main objections to land reform in the pasturelands concerns the making of bigger investments per area of land should more intensive modes of pasturing be enforced. Thus, the preference for the extensive mode of pasturing may simply reflect an unwillingness to invest in improved pastures.

Investments are a must for the viability of smaller-size pasture leases. The operations would necessarily require a financing scheme tailored to the income flows of medium-size ranches.

Pasture leases are normally ineligible as collateral by the banking system. Very little is yet known, if ever they exist, about informal credit sources catering to pasture lease owners. It would be interesting to identify the financial instruments that would work for such activities.

Finally, a closer link must be established between the medium-size cattle ranches and the backyard smallholder sector. The link between the two systems could exploit the advantages of specialization (i.e., breeding vs. fattening). The tie-up could be smoothened if the financing requirements of the small holder could likewise be met. The literature does not reveal the proliferation of informal financial markets for cattle fattening activities in the backyards.

Informal arrangements among cow-calf operators and backyard fatteners, termed as the "Pa-iwi" system (whereby a cattle is loaned to a taker and is fattened using his own farm resources) do exist. The net benefits are equally divided between the two parties once the cattle is sold.

It would be fruitful to pursue the institutional framework, technological requirements, and complementary financial market configuration which promote the viability of smaller-size pasture leases linked with smallholder fattening activities.

BIBLIOGRAPHY

Abad, R.G. "Cattle Production and the CARP." *Agribusiness Weekly*, May 1990.

Abellada, J. "The Cattle Industry and the CARP." *Animal Husbandry and Agricultural Journal* 22, No. 2 (1988).

Alo, A.P. "The Philippines: Slowly Becoming a Beefless Society." *PCARRD Monitor* 18, No. 3 (1990): n. p.

Cabanilla, L.S. "Economic Incentives and Comparative Advantage of the Livestock Industry." Unpublished Ph.D. dissertation, University of the Philippines at Los Baños, 1983.

_____. "Government Incentives and Comparative Advantage in the Philippines' Livestock and Feedstuffs Sectors." Report prepared for the Asian Development Bank, September 1989.

_____. "Understanding Some Trade Policy Issues in the Livestock Industry: A Brief Note." Paper presented at the 37th Annual Convention of the PAEDA held at the Bureau of Soils and Management, Department of Agriculture, Quezon City, 1991.

Castasus, G.A. and J.O. Abellada. "Position Paper on the Cattle Industry." Philippine Cattleman Foundation Incorporated and the Federation of Cattle Raisers Associations, 1990.

Center for Research and Communication. "Cattle Industry Update." *CRC Agribusiness Marketing*, September 1990.

Cortez, R. and C. Saruca, Jr. "A Study on the Impact of Agricultural Credit Institutions on Agricultural Production and the CARP." Unpublished B.S. thesis, University of the Philippines, Diliman, 1987.

Costales, A. "A Jarvis Model for Smallholder Carabao Raising for Draft and Meat." Livestock Sector Program Study, Consultant's Report, Department of Agriculture and Asian Development Bank, 1990.

De Boer, A. J. "Livestock Production Systems and Animal Product Supplies in the Developing Countries of Asia: Historical Developments and Economic Potential." Agricultural Economics Discussion Paper No. 4/76. Brisbane: University of Queensland, 1976.

De Mesa, M. "Credit Requirements of Small-Scale Beef Cattle Raisers in Selected Areas of Batangas." Unpublished B.S. thesis, University of the Philippines at Los Baños, 1983.

Development Bank of the Philippines. "DBP Boosts Cattle Fattening Industry." *Modern Agriculture and Industry - Asia*, September 1979.

Dimaano, E. "Credit Policies and Programs." Vol. 1, Consultant's Report, Department of Agriculture, December 1990.

Dominguez, C. "The Livestock Industry: A Major Contribution to Agricultural Growth." *Animal Husbandry and Agricultural Journal* 22, No. 2 (April 1988): n. p.

Erguiza, A. "Pricing Policy in the Philippine Feedgrain and Livestock Sectors." M.A. thesis, Australian National University, Canberra, 1985.

Fine, J.C. and R.G. Lattimore, (eds.). *Livestock in Asia: Issues and Policies.* Ottawa, Canada: International Development Research Center, 1982.

Fitzhugh, H.A. and A.J. De Boer. "Physical and Economic Constraints to Intensive Animal Production in Developing Countries." In Smith, A.J. and R.G. Gunn, ed., *Intenstive Animal Production in Developing Countries.* Occasional Publication No. 4. Sumey, England: British Society of Animal Production, 1981.

Holt, M.T. and S.R. Johnson. "Supply Dynamics in the U.S. Hog Industry." *Canadian Journal of Agricultural Economics* 36 (1988): n. p.

International Development Research Center. A Framework for Livestock Policy Development in South Korea. Manuscript Report 203e, 1988.

International Food Research Center. "Environmental Policy for Agricultural Sustainability: An IFPRI Research Thrust for the 1990s." Unpublished Draft, 1989.

Ingco, M. "Supply and Demand for Poultry Products in the Philippines." Michigan State University, East Lansing, Michigan, 1985.

Jarvis, L. "To Beef or Not to Beef? Portfolio Choices in Asian Smallholder Cattle Products." *Livestock in Asia,* Ottawa, Canada: International Development Research Center, 1982.

Luz Farms v. Secretary of the Department of Agrarian Reform. 192 Supreme Court Reports Annotated (SCRA) 51 (1990).

Medel, E. "The Financial Requirements of Backyard Feedlot Cattle Livestock Raisers in Tanauan, Batangas." Unpublished B.S. thesis, University of the Philippines at Los Baños, 1983.

Molina, J.Q. "Lecture in Zootechnics 115 - The Cattle Industry in the Philippines." Ruminant Production, University of the Philippines at Los Baños, 1990.

Nazareno, L.E. "What Ails the Cattle Industry." *Agribusiness Weekly,* July-August 1990.

Panayatou, T. and R. Tokrisna. "Microeconomics of Rural Livestock: The Case of Buffalo and Cattle in Thailand." *Livestock in Asia: Issues and Policies.* Ottawa, Canada: International Development Research Center, 1982.

Philippine Council for Agricultural Resources Research and Development, National Academy of Science and Technology. "The Philippines Recommends for Beef Cattle Production." *Technical Bulletin Series No. 9-A.* Los Baños, Laguna, 1985.

Perilla, M. "The Cattle Breeding Farm as Potential Source of Steers/Feeder Stocks for Backyard Feedlot Fattening Project." Unpublished Ph.D. thesis, University of Sto. Tomas, Manila, 1984.

Quisumbing, Ma. A.R. "Land Reform for Forest and Upland Areas: Some Suggestions." *IAST Occasional Papers Series No. 22*. University of the Philippines at Los Baños: Institute of Agrarian Studies, September 1987.

Rae, A.N. and R.D. Lough. "Government Incentives and Comparative Advantage in the Livestock and Feedstuff Sectors in the ASEAN Region." Asian Development Bank Report, 1989.

Republic of the Philippines. Summary of Existing Grazing Leases as of 14 May 1991. Bureau of Forest Development, Department of Environmental and Natural Resources, 1991.

_____. The Philippine Agricultural Development Plan, 1991-1995. Department of Agriculture, 1990.

_____. Bureau of Forest Development. BFD Form No. GM-01. Forest Land Grazing Lease Agreement, 1984.

_____. Ministry Administrative Order (MAO) No. 50. Regulations Governing the Administration, Management and Disposition of Grazing Lands, Communal Grazing Lands, Forest Lands used for Grazing Purposes. Bureau of Forest Development, MNR, 1982.

Samson, A. "Rural Bankers Association of the Philippines' Paper on Credit and CARP." Results and Papers of the Workshop - Conference on Credit and CARP, Central Bank of the Philippines, 1989.

Suk-jin Cho. "Economic Analysis of Beef Production." In IDRC, *A Framework for Livestock Policy Development in South Korea*. Manuscript Report 203e, October 1988.

Sumilang, M.A. "Cattle Raising: An Industry in Pain." *Agriscope*, Vol. 3, No. 11, March 1990.

Tamayo, E. "Easing the Rules for the Livestock Sector." *Farming Today*, August 1979.

Winrock International. "Philippine Livestock Sector Program Study, Main Report." Prepared for the Government of the Philippines and the ADB, 1991.

Yazman, J. "Livestock Production Resources in the Philippines." Consultant's Report, Department of Agriculture, Philippines, March 1991.

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